Profiles

JSC engineer honored by Air Force

By Kylie Moritz

Royce Forman has been a leader in the field of structural integrity and safety of aircraft for more than 40 years.

In December, the United States Air Force Aircraft Structural Integrity Program (ASIP) recognized Forman's expertise. The award is in honor of a structural integrity and safety pioneer, John W. Lincoln, and is presented every year to a distinguished career expert who has made significant contributions toward advancements in aircraft structural integrity and safety.

"It was a surprise to receive the award," Forman said.

Forman's career began to excel at the Wright-Patterson Air Force Base in Ohio. There he investigated crack problems in Vietnam War aircraft. During those investigations he initiated the use of fracture mechanics to examine aircraft in the Air Force, studying the growth rate and the instability of crack defects. He also developed the universally known "Forman Equation" used in predicting the growth rate of fatigue cracks.

Forman then moved to Nassau Bay to work at Johnson Space Center in 1967. He is now the senior engineer overseeing fracture mechanics technology, testing and development at JSC. One of his biggest achievements was to initiate the development of a fracture control analysis software code.

He formed the NASA Fracture Control Methodology Panel and originated the Space Act Agreement between NASA and the Southwest Research Institute to develop the software. He now manages NASA's role in a 13-company consortium to maintain and upgrade the software program.

NASA JSC 2003e00584 Photo by Bill Stafford

The software Forman developed is called NASGRO. It helps engineers analyze fatigue crack growth, as well as assess the structural life of materials and the effects of stress on the equipment. Many companies outside of NASA, as well as the United States Department of Defense and the Federal Aviation Administration, use the NASGRO software program.

As the JSC representative of the NASA Fracture Control Methodology Panel, Forman also spearheaded the development and publication of NASA's fracture control requirements documents for space shuttle payloads and the International Space Station. He continues to contribute to the field of structural integrity by authoring papers and publications. As a result, much of his work is internationally recognized, included in technical books and taught in college courses.

For his dedicated efforts throughout the years, Forman has received a Silver Snoopy Award, numerous performance awards from NASA and a Man of the Year award from the Air Force Flight Dynamics Laboratory.

His most recent recognition from the Air Force was a true honor for Forman. "I attend the ASIP conference every year and personally know all of the six previous winners," he said. "There are a number of people that deserve the award, and I hoped that someday I would be honored."

More information about the award can be found at the ASIP Web site: http://www.asipcon.com/index.htm

Solar-powered refrigerator keeps things cool with the hot sun

By Joanne Hale

When JSC engineer Michael K. Ewert entered his design for a solar powered house in his sixth grade science fair he never dreamed he would some day be designing air conditioning systems for human habitat on the moon. But that is exactly how it turned out.

Ewert, who has been working on developing a cooling system for the moon since 1992, took his original design concept and applied it to a more down to earth application: solar powered refrigeration.

"I began looking at what people were doing on earth and became interested in solar refrigeration systems," said Ewert. "Technically it is the same type of cooling system but on a smaller scale."

As a result, Ewert was awarded his third patent since 2001 for his solar-powered refrigeration system. This latest patent focuses on the innovative control techniques that enable the refrigerator to run efficiently.

The solar refrigerator, a battery-free 4 cubic ft. design, is operated by a variable speed compressor, solar panel and thermal storage unit that work together to utilize the sun's energy and run the refrigerator with optimum efficiency.

"The refrigerator can run on as little as five hours of sun a day," said Ewert. "The control system matches the amount of sunshine to the compressor's speed so that it can run slow in the morning and speed up in the afternoon when the sun is most intense. During a stretch of cloudy days the refrigerator builds up thermal storage and can remain cold for up to a week."

SunDanze Refrigeration, Inc., founded by co-inventor David Bergeron, is currently selling the solar cooling system for $1,150. Two dozen have sold to date and Ewert has high hopes for the refrigerator's future.

"The startup company is small but sales have continually increased," Ewert said. "I see the first potential use in the area of small business. It (solar refrigerator) could easily be used for such things as selling refreshments. Hopefully the price will come down and more people will be able to use it."

Ewert says he enjoys working on inventions that have worldwide implications, such as his solar refrigeration concept, because of the benefit that he can bring to people around the globe.

"It inspires me to work on technology knowing it has the potential to improve people's lives," Ewert said.

Ewert is hoping to promote his unique solar cooling technology to the automotive industry later this year. ❖

NASA JSC 2003e01555 Photo by Mark Sowa

Michael Ewert receives the Inventor Award from Sue Garman at the JSC Inventor's Luncheon

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